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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,694	02/27/2004	Stephen M. Potter	3932	9316

22474 7590 08/10/2005

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EXAMINER	
MCNELIS, KATHLEEN A	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/789,694	POTTER ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05/25/2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

CLAIMS STATUS

Claims 1-8 remain for examination, wherein claims 1-5 and 7 are amended. Claims 9 and 10 have been added.

EXAMINER'S COMMENTS

The application claims benefit of provisional application 60/450,855. The amended claim 1 contains subject matter that was not disclosed in the provisional application; specifically, it was not originally disclosed that the invention applied to "sedimentary" iron ore, or that the pre-drying of feed was "to a water content less than about 0.5% by weight." The effective filing date for amended claim 1, and claims 2-6 and 9 which depend from claim 1 is therefore the date that the additional disclosures were filed: 02/27/2004. Similarly, new claim 9 contains subject matter that was not disclosed in provisional application 60/450,855; specifically it was not disclosed that the pre-dried iron ore must be charged separately from any lime coated pellet feed material, and therefore does not qualify for the earlier filing date of the provisional application.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et. al., US patent publication 6,395,056 in view of Lotosh, et al., US patent publication 4,049,435.

With respect to amended claim 1: Villarreal-Trevino et. al. disclose a pretreatment process for solid iron ore lump feed material to be directly reduced in a gas and pellet/lump-based moving bed shaft (abstract, col 2 lines 48-67). Villarreal-Trevino et. al. state that their process is applicable for **lumps of iron ore**, pellets, sinter or otherwise agglomerated iron oxides (col. 2, line 66- col. 3, line 2), which is broad

enough to encompass "sedimentary iron ore". One process option disclosed in Villarreal-Trevino et. al. includes pre-heating the lump feed to above 600 °C prior to processing in the reduction furnace (claim 1), thus it is implicit that the Villarreal-Trevino et. al. process will result in "increasing the thermal profile of the furnace" and result in a smaller "zone of low-temperature reduction." Villarreal-Trevino et. al. disclose that the purpose of pre-treatment in non-reducing conditions is to strengthen the ore, thereby decreasing the formation of fines in the reduction reactor (abstract and col. 2, lines 13-16). Villarreal-Trevino et. al. indicate that their invention is concerned with preserving the strength of "iron ore lumps or pellets" (col. 1, lines 59-61). Villarreal-Trevino et. al. indicate that while their invention is described as applied to lumps of iron ore, it is also applicable to pellets, sinter or otherwise agglomerated iron oxides (col. 2, line 66- col. 3, line 2), indicating that for purposes of their invention, the pellet and lump iron ore feed materials are interchangeable.

Villarreal-Trevino et. al. do not prescribe a time for stockpiling the ore, or disclose the moisture content of pretreated ore. Lotosh et. al. disclose a "method for obtaining a lump product" which includes pretreatment of iron ore pellets to achieve strengthening prior to use in a process. In the discussion of their invention, Lotosh et. al. disclose a preliminary aging treatment which "can be effected in floor-type storehouses" in atmospheric conditions, for a predetermined time (col. 5, lines 1-8) for strengthening pellets. The preliminary aging treatment effected in floor-type storehouse disclosed is equivalent to the claimed "stockpile." Since the use of pellets and lump iron ore is interchangeable in the Villarreal-Trevino et. al. invention, it would have been obvious to

one of ordinary skill in art at the time the invention was made to stockpile the lump ore or pellets for a predetermined time for strengthening as disclosed by Lotosh et. al. (col. 5, lines 1-8), prior to use in the method disclosed by Villarreal-Trevino et. al.

Lotosh et al. disclose as part of their invention a drying process that reduces the water content of lump ore to between 0.01 and 1% free moisture content (col. 5, lines 37-44), which overlaps the claimed range of less than 0.5% by weight. It would have been obvious to one or ordinary skill in the art at the time the invention was made to dry the lump ore to a water content of less than about 0.5% in the Villarreal-Trevino et. al. pretreatment process, since Lotosh teaches that the entire range between 0.01 and 1% water is beneficial for strengthening (claim 1).

With respect to amended claim 2, Lotosh et. al., provide an example for implementation of the invention based on prior art wherein a 28 day aging process is required (col. 4, lines 26-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to age pellets for at least one month prior to use in the Villarreal-Trevino et. al. invention, where this duration is beneficial to achieve higher compressive strengths as disclosed in Lotosh et. al. (col.4, lines 29-35).

With respect to amended claim 3, Lotosh et. al., disclose a two stage drying process: the first stage operating with temperatures ranging from 60 °C to 250 °C, and the second stage with temperatures ranging from 100 °C to 900 °C (claim 1), both of which overlap the claimed drying temperature of about 200 °C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to dry lump

ore or pellets in the Villarreal-Trevino et al. process at a temperature of about 200 °C to obtain a strengthened ore product as disclosed by Lotosh et. al. (claim 1).

With respect to amended claims 4 and 5, Villarreal-Trevino et al. disclose a process wherein pre-heating is performed in a feed storage bin which is heated by waste off-gases at a sufficient temperature to heat the feed material in the storage bin to a temperature within the range of 75 °C to 1,100 °C (col. 3, lines 31-49 and Figure 5). The temperature of the waste off-gas is not explicitly stated, however it is sufficient to heat the solids to within 75 °C to 1,100 °C, which overlaps the claimed range of "in excess of 300 °C". It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize hot off-gases above 300 °C as claimed by applicant for pre-drying solids in the Villarreal-Trevino et al. process, in order to heat solids to a temperature of above about 600 °C as disclosed by Villarreal-Trevino et al. (claim 1).

With respect to original claim 6, Villarreal-Trevino et al. teach a process option (see Figure 5 below), which includes a reformer (69) to produce the reducing gas (col. 4, lines 12-34). The reducing gas is fed to the furnace (**30**), then waste off-gases are removed from and cooled in a heat exchanger (**44**), then either returned to the reformer, treated in another manner, or combusted as part of the fuel for the pretreatment system (Figure 5). The applicant's use of the phrase "associated with" is interpreted to mean anywhere in the system as opposed to directly connected to.

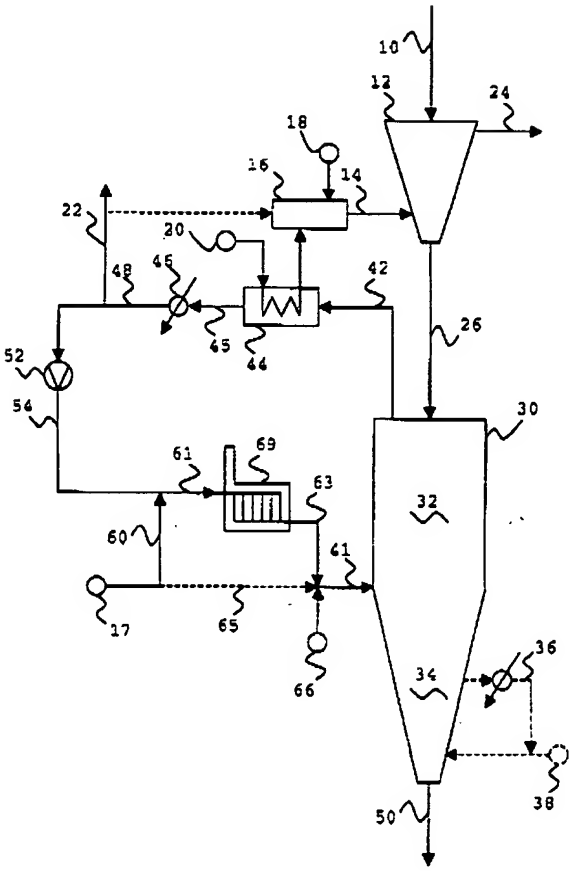

Figure 5

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et al. in view of Lotosh et. al, as applied to claim 1 above, and further in view of Baum, US patent publication 3,941,582.

Neither Villarreal-Trevino et al. nor Lotosh et. al. specifically address the issue of DRI product re-hydration and re-oxidation, nor caution protection from moisture exposure during intermediate processing steps. Baum discloses the common storage problem associated with sponge iron, which tends to re-hydrate and re-oxidize upon exposure to moisture and ordinary handling (col. 1, lines 38-54). Baum indicates that in producing DRI, the moisture content must be carefully controlled during processing (col.

8, lines 20-34). The segregation requirement in claim 9 for the pre-dried iron ore lump feed material from any lime coated pellet feed material is disclosed as being necessary due to re-hydration issues. It would have been obvious to one of ordinary skill in the art at the time the invention was made to segregate the pre-dried iron ore from moisture and moisture bearing materials in the process described by Villarreal-Trevino et. al. in view of Lotosh et al., to prevent re-hydration and oxidation as disclosed in Baum (col. 8, lines 20-34).

. Claims 7 and 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et al. in view of Beggs et, al., US patent 3,764,123.

Villarreal-Trevino et al. disclose an apparatus for preheating feed material to a direct reduction shaft furnace, see figure 5 above. Villarreal-Trevino et al. disclose a moving bed reactor (col.2 lines 48-51) which is equivalent to the claimed "shaft furnace" having an "upper feeding and heating portion" (**12**), a "middle gas feeding and reducing portion" (**32**), "and a lower product discharge portion" (**34** and **50**). Means is provided "for removing hot gas from the furnace" (**42**), and for "reforming removed off-gas" (**69**). A "feed material storage bin" (**12**) is provided, with means for "removing waste off-gas communicating with said storage bin for heating the contents thereof" (**24**) and "means of transporting the heated feed material to the furnace and for charging the heated feed material into the shaft furnace for reduction" (**26**); the feed material storage bin is depicted as a hopper (**12**; col. 4, lines 23-24).

Villarreal-Trevino et al. do not specifically teach a means for heating the reformer by the combustion of gas, but this feature is conventional as evidenced by Beggs, et.

al., Figure 1 below, which discloses a reformer (**38)** for reforming removed off-gas from a vertical shaft furnace, including a means for heating the reformer by combustion of gas (fuel fired burners, **40**), and means for removing waste combusted off-gas from reformer (flue pipe, **42)** . Therefore, it would have been obvious for one of ordinary skill in the art to incorporate the gas fired combustion heated reformer of Beggs et al. into the process of Villarreal-Trevino et al. to produce a hot reducing gas with a controlled high reductant content relative to oxidant content as disclosed by Beggs et al.

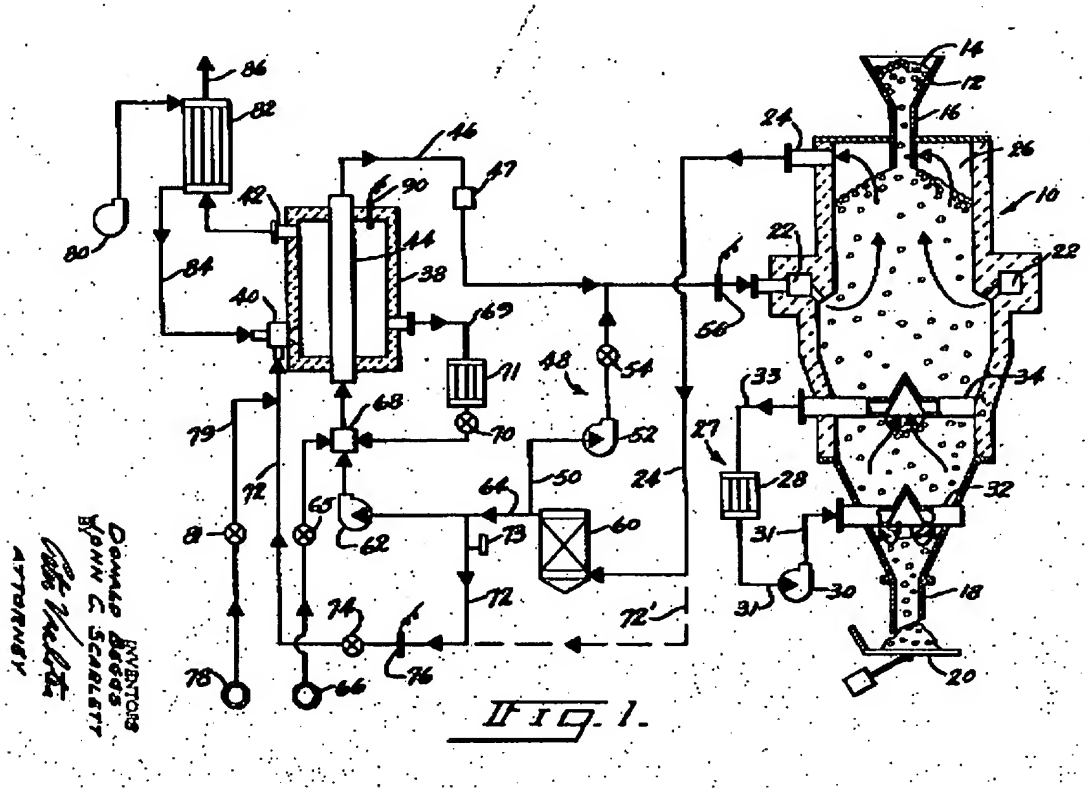

FIG. 1.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et al. in view of Beggs et al., as applied to claim 7 above, and further in view of Becerra-Novoa et al, US patent 5,445,363.

Villarreal-Trevino et al. disclose a shaft furnace according to applicant's claim 7, but do not specifically state that the feed storage bin is enclosed or that the means for transporting the heated feed material to the furnace is insulated. Since gas streams are injected into and collected from the feed storage bin (Figure 5, **(14)** gas inlet and **(24)** gas outlet), it is implicit that the bin is enclosed. Villarreal-Trevino et al does not disclose that piping **26** is insulated, but this feature is conventional as evidenced by Becerra-Novoa et al which discloses an apparatus for reducing ore comprising piping **38** which is insulated to conserve energy (col. 13, lines 55-60). It would have been obvious to one of ordinary skill in art at the time the invention was made to insulate the Villarreal-Trevino et al piping **26** in view of Beggs et al., in order to conserve energy as disclosed by Becerra-Novoa et al.

With respect to claim 10, Villarreal-Trevino et al. (Figure 5, and col.4 line 20 to column 6 line 16) disclose a heat exchanger (44) and combustion chamber (16) between the means for recovering waste combusted off gas (42) and the feed material storage bin (12). Both the heat exchanger and the combustion chamber provide means for adjusting the temperature of the off-gas.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 7 and 8 are provisionally rejected under 35 U.S.C. 101 as claiming the same apparatus as that of claims 6 and 7 of copending Application No.10/789,696. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Response to Arguments

Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated. Any inquiry concerning this communication or earlier communications from the examiner should be directed to

Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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